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27 August 2004

MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION

SUBJECT: Initial Draft of MIL-M-38510/4D; Project Number 5962-2075

The initial draft for the subject document, dated 27 August 2004, is now available for viewing and downloading from the DSCC-VA Web site:

<http://www.dscc.dla.mil/Programs/MilSpec/DocSearch.asp>

Major changes to this document include updating it to current MIL-STD-961 requirements, deleting burn in and life test circuits, and changing the requirements to align with MIL-PRF-38535.

Concurrence or comments are required at this Center within 45 days from the date of this letter. Late comments will be held for the next coordination of the document. Comments from military departments must be identified as either "Essential" or "Suggested". Essential comments must be justified with supporting data. Military review activities should forward comments to their custodians of this office, as applicable, in sufficient time to allow for consolidating the department reply.

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\Signed\
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Chief
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cc:
VQC
VSS

*NOTE: This draft, dated 27 August 2004 prepared by the Defense Supply Center Columbus (DSCC-VAS) has not been approved and is subject to modification. DO NOT USE PRIOR TO APPROVAL.
(Project 5962-2075)*

MIL-M-38510/4D
draft

SUPERSEDED
MIL-M-38510/4C
25 February 1977
MIL-M-0038510/4B(USAF)
15 October 1973

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, TTL, MULTIPLE NOR GATES, MONOLITHIC SILICON

Inactive for new design after 7 September 1995.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product herein shall consist of this specification sheet and MIL-PRF 38535

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic, silicon, TTL, positive NOR logic gating microcircuits. Three Two product assurance classes and a choice of case outlines and lead finishes are provided for each type and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).

1.2 Part or Identifying Number (PIN). The PIN shall be is in accordance with MIL-M-38510 MIL-PRF-38535, and as specified herein.

1.2.1 Device types. The device types shall be are as follows:

<u>Device type</u>	<u>Circuit</u>
01	Quadruple 2-input positive NOR gate
02	Dual 4-input positive NOR gate with strobe and expandable input
03	Dual 4-input positive NOR gate with strobe
04	Triple 3-input positive NOR gate

1.2.2 Device class. The device class shall be is the product assurance level as defined in MIL-M-38510 MIL-PRF-38535.

1.2.3 Case outlines. The case outlines shall be are as designated in See MIL-M-38510, appendix C MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
A	F-1 (14-pin, $\frac{1}{4}$ " x $\frac{1}{4}"), GDFP5-F14 or CDFP6-F14$	14	Flat pack
B	F-3 (14-pin, $\frac{1}{4}$ " x $\frac{3}{16}"), GDFP4-14$	14	Flat pack
C	D-1 (14-pin, $\frac{1}{4}$ " x $\frac{3}{4}"), GDIP1-T14 or CDIP2-T14$	14	Dual-in-line
D	F-2 (14-pin, $\frac{1}{4}$ " x $\frac{3}{8}"), GDFP1-F14 or CDFP2-F14$	14	Flat pack
E	D-2 (16-pin, $\frac{1}{4}$ " x $\frac{7}{8}"), GDIP1-T16 or CDIP2-T16$	16	Dual-in-line
F	F-5 (16-pin, $\frac{1}{4}$ " x $\frac{3}{8}"), GDFP2-F16 or CDFP3-F16$	16	Flat-pack

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43218-3990, or emailed to bipolar@dsc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil.

1.2.4 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
Input voltage range	-1.5 V dc at -12 mA to +5.5 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation per gate, P_D	60 mW dc 1/ 300°C
Lead temperature (soldering 10 seconds)	(See MIL-STD-1835) {0.09°C/mW for flat pack {0.08°C/mW for dual-in-line pack}
Junction temperature (T_J) 2/.....	175°C

1.2 Recommended operating conditions.

Supply voltage.....	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage	2.0 V dc
Maximum low level input voltage	0.8 V dc
Normalized fanout (each output)	10 maximum
Ambient Case operating temperature range (T_C)	-55°C to 125°C

2.0 APPLICABLE DOCUMENT

2.1 Issues of documents. The following document, of the issue in effect on date of invitation for bids or request for proposal, forms a part of this specification to the extent specified herein.

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

MILITARY DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-M-38510 - Microcircuits, General Specification for.
MIL-PRF-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

MILITARY DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard for Microelectronics.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines

(Copies of the specifications standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.) (Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or www.dodssp.daps.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

1/ Must withstand the added P_D due to short circuit condition (e.g. I_{OS}) at one output for 5 seconds duration.

2/ Maximum junction temperature should not be exceeded except in accordance with allowable short duration burn-in screening condition in accordance with MIL-PRF-38535.

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. Microcircuits furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturers list before contract award (see 4.3 and 6.4).

3.2 Item requirements. The individual item requirements shall be in accordance with MIL-M-38510, and as specified herein. The individual item requirements shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 MIL-PRF-38535 and herein.

3.3.1 Logic diagram and terminal connections. The logic diagram and terminal connections shall be as specified on figure 1.

3.3.2 Truth tables and logic equations. The truth tables and logic equations shall be as specified on figure 2.

3.3.3 Schematic circuit. The schematic circuit shall be as specified on figure 3 maintained by the manufacturer and made available to the qualifying activity and the preparing activity upon request..

3.3.4 Case outlines. Case outlines shall be as specified in 1.2.3.

3.4 Lead material and finish. Lead material and finish shall be in accordance with MIL-M-38510 MIL-PRF-38535 (see 6.6).

3.5 Electrical performance characteristics. The electrical performance characteristics are as specified in table 1 and apply over the full recommended ambient case operating temperature range, unless otherwise specified.

3.6 Rebonding. Rebonding shall be in accordance with MIL-M-38510.

3.7 Electrical test requirements. Electrical test requirements shall be as specified in table III for the applicable device type and device class. The subgroups of table III which constitute the minimum electrical test requirements for screening, qualification, and quality conformance by device class are specified in table II.

3.6 Electrical test requirements. The electrical test requirements for each device class shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table III.

3.7 Marking. Marking shall be in accordance with MIL-PRF-38535 MIL-M-38510. At the option of the manufacturer, the following marking may be omitted from the body of the microcircuit, but shall be retained on the initial container:

a. Country of origin.

3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 1 (see MIL-M-38510, appendix E see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ <u>unless otherwise specified</u>	Device type	Limits		
				Min	Max	Unit
High-level output voltage	V_{OH}	$V_{CC} = 4.5 \text{ V}$, $V_{IN} = 0.8 \text{ V}$, $I_{OH} = -800 \mu\text{A}$	03, 04	2.4		V
		$V_{CC} = 4.5 \text{ V}$, $V_{IN} = 0.8 \text{ V}$, $I_{OH} = -400 \mu\text{A}$	01	2.4		V
		$V_{CC} = 4.5 \text{ V}$, $V_{IN} = 0.8 \text{ V mA}$, $I_{OH} = -800 \mu\text{A}$	02	2.4		V
		$V_{CC} = 4.5 \text{ V}$, $I_x^- = 0.15 \text{ mA}$, $I_x = 0.15 \text{ mA}$, $I_{OH} = -400 \mu\text{A}$ <u>1/</u>				
Low-level output voltage	V_{OL}	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 16 \text{ mA}$, $V_{IN} = 2.0 \text{ V}$ <u>2/</u>	01, 03 04		0.4	V
		$V_{CC} = 4.5 \text{ V}$, $V_{IN} = 2.0 \text{ V}$, $I_{OL} = 16 \text{ mA}$ <u>2/</u>	02		0.4	V
		$V_{CC} = 4.5 \text{ V}$, $I_x = 0.3 \text{ mA}$, $R_x = 138 \Omega$, $I_{OL} = 16 \text{ mA}$ <u>3/</u>				
Expander current	I_x	$V_{CC} = 5.0 \text{ V}$, $I_{OL} = 16 \text{ mA}$, $V_x = 0.4 \text{ V}$, T_A <u>$T_C = -55^{\circ}\text{C}$</u> <u>4/</u>	02		3.5	mA
Base-emitter voltage	V_{BE}	$V_{CC} = 5.0 \text{ V}$, $I_x = 0.41 \text{ mA}$, $I_{OL} = 16 \text{ mA}$, T_A <u>$T_C = -55^{\circ}\text{C}$</u> <u>5/</u>	02		1.1	V
High-level input current	I_{IH1}	$V_{CC} = 5.5 \text{ V}$, Data input = 2.4 V	All		40	μA
		$V_{CC} = 5.5 \text{ V}$, Strobe input = 2.4 V	02, 03		160	μA
High-level input current	I_{IH2}	$V_{CC} = 5.5 \text{ V}$, Data input = 5.5 V	All		100	μA
		$V_{CC} = 5.5 \text{ V}$, Strobe input = 5.5 V	02, 03		400	μA
Low-level input current	I_{IL1}	$V_{CC} = 5.5 \text{ V}$, Data input = 0.4 V <u>6/</u>	01	-.55	-1.6	mA
			02, 03, 04	-1.7	-1.6	mA
	I_{IL2}	$V_{CC} = 5.5 \text{ V}$, Strobe input = 0.4 V <u>6/</u>	02, 03	-2.8	-6.4	mA
Short-circuit output current	I_{OS}	$V_{CC} = 5.5 \text{ V}$, $V_{IN} = 0 \text{ V}$ <u>7/</u>	All	-20	-55	mA
High-level supply current per gate	I_{CCH}	$V_{CC} = 5.5 \text{ V}$, $V_{IN} = 0 \text{ V}$	01		4	mA
			02, 03		8	mA
			04		5.2	mA

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ <i>unless otherwise specified</i>	Device type	Limits		
Low-level supply current per gate	I_{CCL}	$V_{\text{CC}} = 5.5 \text{ V}$, $V_{\text{IN}} = 5 \text{ V}$	01		6.5	mA
			02, 03		9.5	mA
			04		8.5	mA
Input clamp voltage	V_{IC}	$V_{\text{CC}} = 4.5 \text{ V}$, $I_{\text{IN}} = -12 \text{ mA}$, $T_A = T_C = 25^{\circ}\text{C}$	All		-1.5	V
Propagation delay time high-to-low level	t_{PHL}	$C_L = 50 \text{ pF}$ minimum, $R_L = 390 \Omega \pm 5 \text{ percent}$	All	3	24	ns
Propagation delay time low-to-high level	t_{PLH}	$C_L = 50 \text{ pF}$ minimum, $R_L = 390 \Omega \pm 5 \text{ percent}$	01, 03, 04	3	27	ns
			02	3	30	ns

1/ See test figure 7.

2/ All unspecified inputs grounded.

3/ See test figure 6.

4/ See test figure 9.

5/ See test figure 8.

6/ All unspecified inputs at 5.5 V.

7/ Not more than one output should be shorted at a time.

TABLE II. Electrical test requirements.

<u>MIL-STD-883 MIL-PRF-38535</u> Test requirement	Subgroups (see table III)		
	Class A S Devices	Class B Devices	Class C Devices
Interim electrical parameters (Pre Burn-In) (method 5004)	1	1	Not required
Final electrical test parameters (method 5004)	1*, 2, 3, 7, 9, 10, 11	1*, 2, 3, 7, 9	1, 7
Group A test requirements (Method 5005)	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3 7, 9	1, 2, 3, 7, 9
<u>Group B electrical test parameters when using the method 5005 QCI option</u>	<u>1, 2, 3, 7, 8, 9, 10, 11</u>	<u>1, 2, 3 7, 9</u>	
Groups C and D end point electrical parameters (method 5005)	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3	4
Additional electrical subgroups for Group C periodic inspections	None	10, 11	None

*PDA applies to subgroup 1 (see 4.3c.).

4. PRODUCT ASSURANCE PROVISIONS VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with ~~MIL-M-38510 and method 5005 of MIL-STD-883, except as modified herein. MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not effect the form, fit, or function as described herein.~~

4.2 Qualification inspection. Qualification inspection shall be in accordance with ~~MIL-M-38510 MIL-PRF-38535 and 4.3.1 and 4.3.2 herein. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.5).~~

4.2 Screening. Screening shall be in accordance with ~~method 5004 of MIL-STD-883, MIL-PRF-38535~~ and shall be conducted on all devices prior to qualification and ~~quality~~ conformance inspection. The following additional criteria shall apply:

- a. Burn-in test (method 1015 of MIL-STD-883).
 - (1) ~~Test condition D or E, using the circuit shown on figure four, or equivalent.~~
 - a. The burn-in test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.
- b. Interim and final electrical test parameters shall be as specified in table II, except interim electrical parameters test prior to burn-in is optional at the discretion of the manufacturer.

- c. Percent defective allowable (PDA). The PDA for class A devices shall be as specified in MIL-M-38510 (see 4.6.1.2). The PDA is specified as 10 percent for class B devices based on failures from group A, subgroup 1 test after cool down as final electrical test in accordance with method 5004 of MIL-STD-883, and with no intervening electrical measurements. If interim electrical parameter tests are performed prior to burn-in, failures resulting from pre burn-in screening may be excluded from the PDA. If interim electrical parameter tests prior to burn-in are omitted, then all screening failures shall be included in the PDA. The verified failures of group A, subgroup 1 after burn-in divided by the total number of devices submitted for burn in in that lot shall be used to determine the percent defective for that lot, and the lot shall be accepted or rejected based on the PDA for the applicable device class.
- c. Additional screening for space level product shall be as specified in MIL-PRF-38535.

4.3 Qualification inspection. Qualification inspection shall be in accordance with MIL-M-38510 MIL-PRF-38535 and 4.3.1 and 4.3.2 herein. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.5).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table I of method 5005 of MIL-STD-883 table III of MIL-PRF-38535 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, and 6 ~~7 and 8~~ of table I of method 5005 of MIL-STD-883 shall be omitted.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of method 5005 of MIL-STD-883 MIL-PRF-38535.

4.4.3 Group C and D inspection. Group C and D inspection shall be in accordance with table III of method 5005 of MIL-STD-883 table IV of MIL-PRF-38535 and as follows:

- a. End point electrical parameters shall be as specified in table II herein.
- b. Subgroups 3 and 4 shall be added to the group C inspection requirements for class B devices and shall consist of the tests, conditions, and limits specified for subgroups 10 and 11 of group A.
- c. Operating life test (method 1005 of MIL-STD-883) conditions:
The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
(1) Test condition D or E, using the circuit shown on figure four, or equivalent.
(2) $T_A = 125^\circ\text{C}$, minimum.
(3) Test duration: 1,000 hours, except as permitted by appendix B of MIL-M-38510.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods of examination and test inspection. Methods of examination and test inspection shall be as specified in the appropriate tables and as follows:

4.5.1 Voltage and current. All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional current and positive when flowing into the referenced terminal.

4.5.2 Life test cooldown procedure. When devices are measured at 25°C following application of the operating life or burn-in test condition, they shall be cooled to room temperature prior to removal of the bias. Alternately, the bias may be removed during cooling if the case temperature is reduced to room temperature within 30 minutes after removal of the test condition.

4.6 Inspection of preparation for delivery. The requirements for packaging shall be in accordance with MIL-M-38510, except that the rough handling test shall not apply.

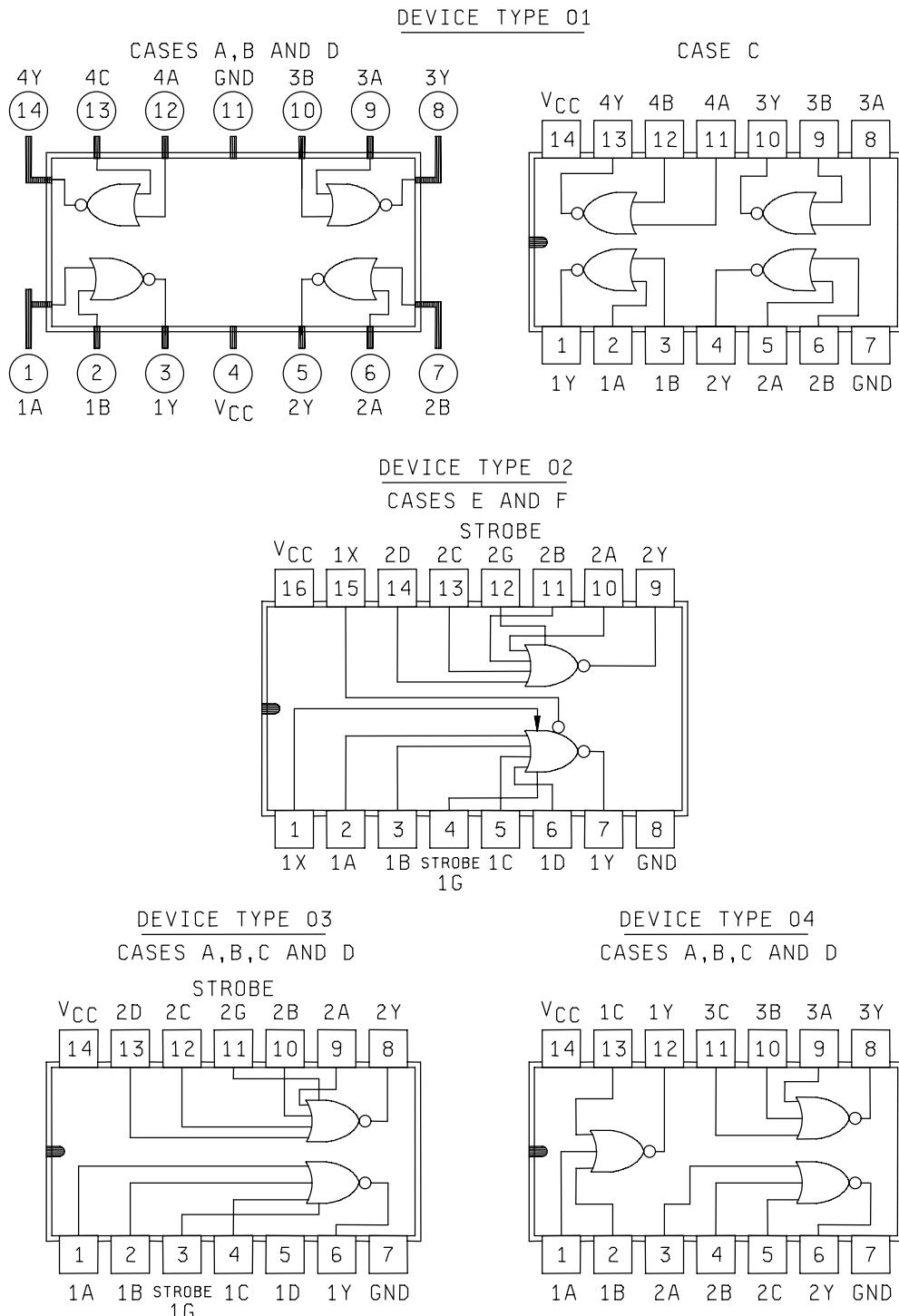


Figure 1. Logic diagram and terminal connections (top view).

Device type 01

Truth table each gate		
Input		Output
A	B	Y
H	X	L
X	H	L
L	L	H

X = Irrelevant

Positive logic: $Y = \overline{A + B}$

Device type 02

Truth table gate 1						
Input						Output
1A	1B	1C	1D	1X	1G	1Y
H	X	X	X	X	H	L
X	H	X	X	X	H	L
X	X	H	X	X	H	L
X	X	X	H	X	H	L
X	X	X	X	ON	X	L
L	L	L	L	OFF	X	H
X	X	X	X	OFF	L	H

X = Irrelevant

1X = Expander Input

Positive logic: $1Y = \overline{1G(1A + 1B + 1C + 1D + 1X)}$

Truth table gate 2					
Input					Output
2A	2B	2C	2D	2G	2Y
H	X	X	X	H	L
X	H	X	X	H	L
X	X	H	X	H	L
X	X	X	H	H	L
L	L	L	L	X	H
X	X	X	X	L	H

X = Irrelevant

Positive logic: $2Y = \overline{2G(2A + 2B + 2C + 2D)}$

Figure 2. Truth tables and logic equations.

Device type 03

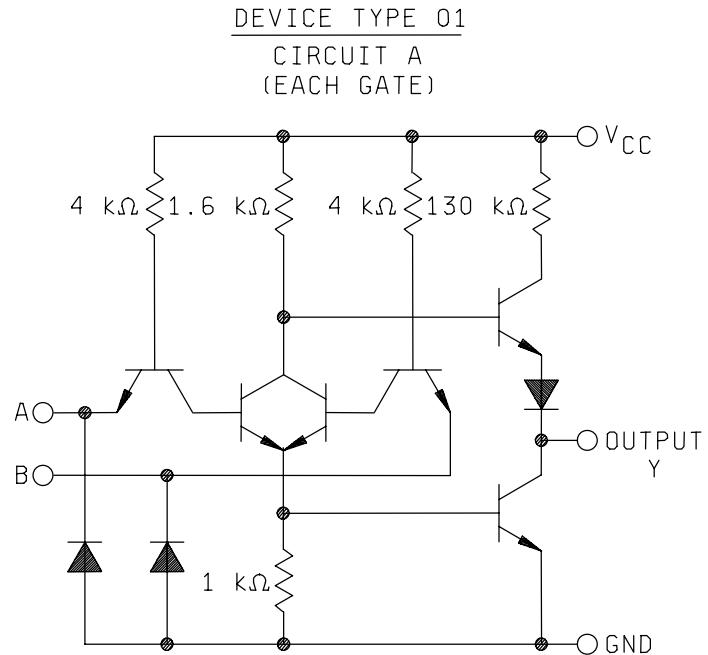
Truth table each gate					
Input					Output
A	B	C	D	G	Y
H	X	X	X	H	L
X	H	X	X	H	L
X	X	H	X	H	L
X	X	X	H	H	L
L	L	L	L	X	H
X	X	X	X	L	H

 $X = \text{Irrelevant}$ Positive logic: $Y = \overline{G(A + B + C + D)}$

Device type 04

Truth table each gate			
Input			Output
A	B	C	Y
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

 $X = \text{Irrelevant}$ Positive logic: $Y = \overline{A + B + C}$ Figure 2. Truth tables and logic equations – Continued.



NOTE: Component values shown are nominal.

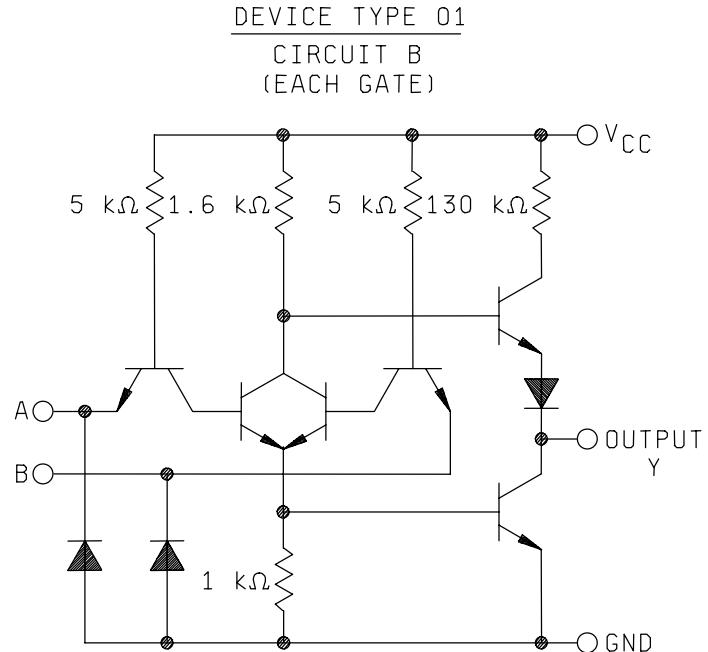
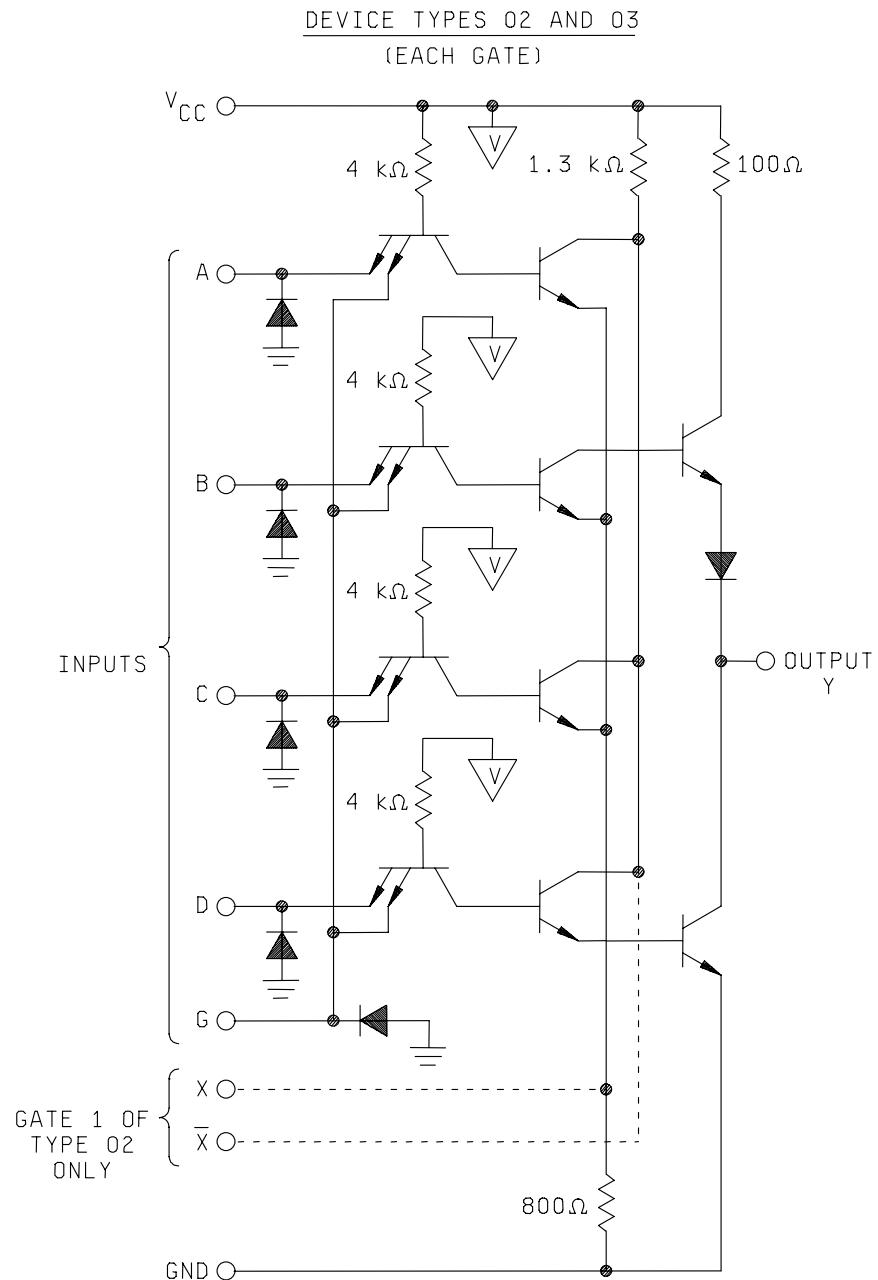


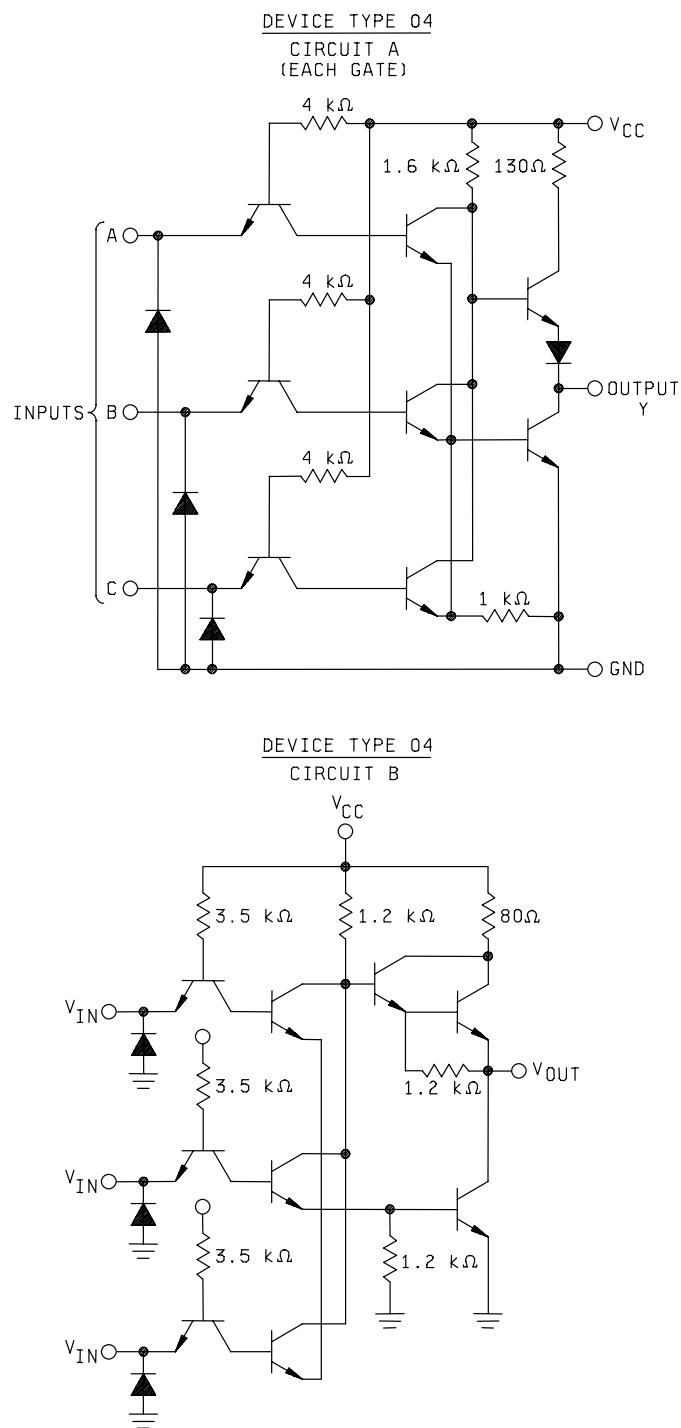
FIGURE 3. Schematic circuits.



NOTES:

1. Component values shown are nominal.
2. Both expander inputs are used simultaneously for expanding.
3. If expander is not used leave X and \bar{X} open.
4. A total of four expander gates can be connected to the expander inputs.
5. Input G is strobe input.

FIGURE 3. Schematic circuits - Continued.

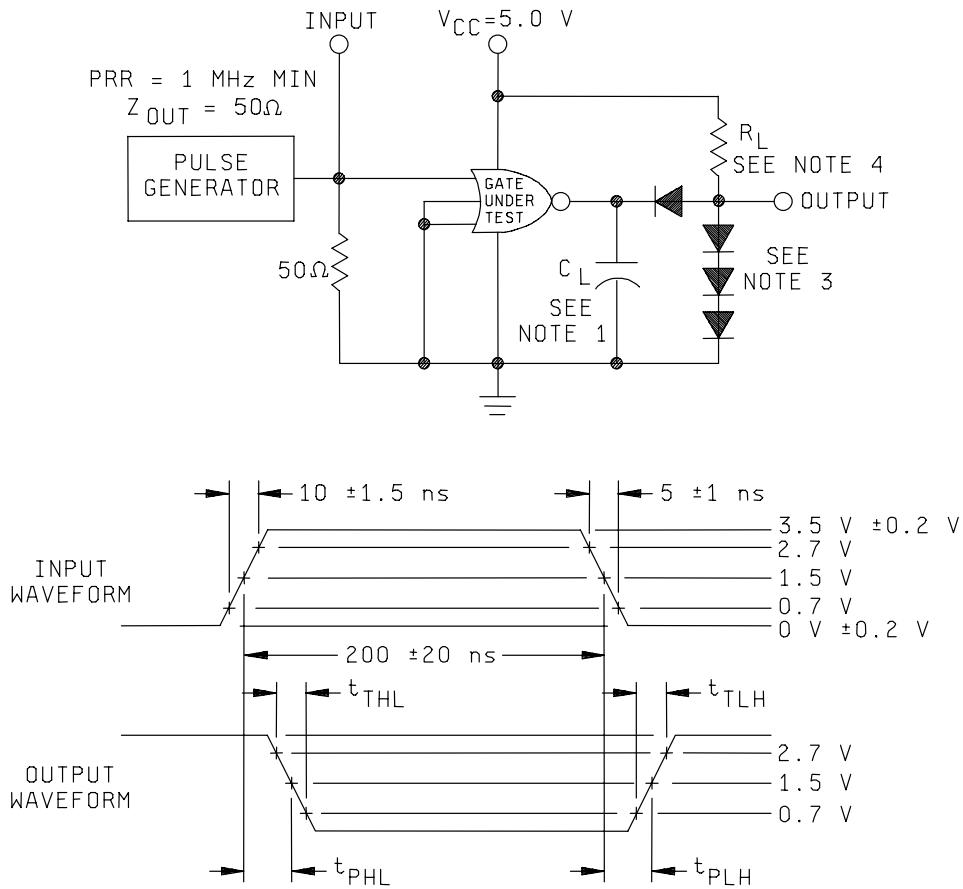


NOTE: Component values shown are nominal.

FIGURE 3. Schematic circuits - Continued.

BURN-IN AND LIFE TEST CIRCUITS HAVE BEEN DELETED

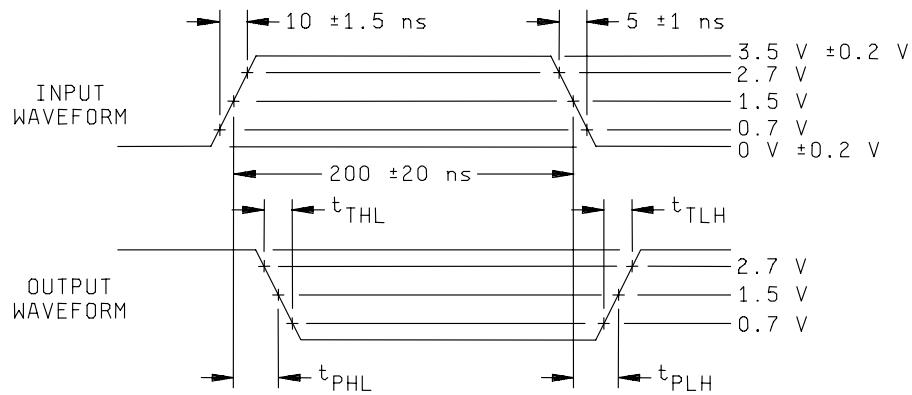
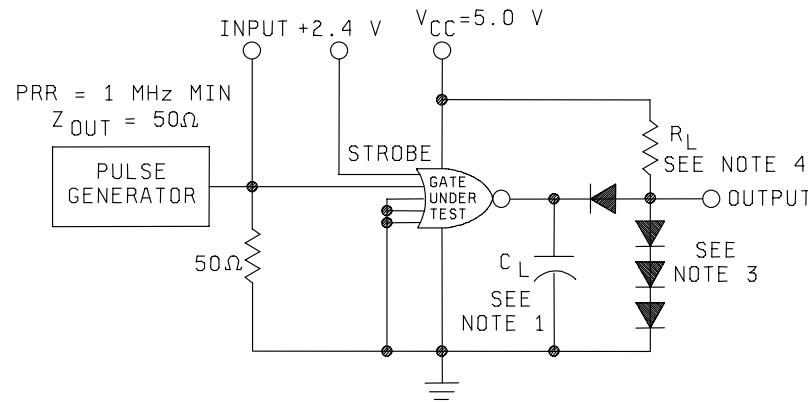
FIGURE X. Burn-in and life test circuit.



NOTES:

1. C_L = 50 pF minimum including scope probe, wiring, and stray capacitance, without package in test fixture.
2. Voltage measurements are to be made with respect to network ground terminal.
3. All diodes are 1N3064 or equivalent.
4. R_L = 390 Ω ± 5%.

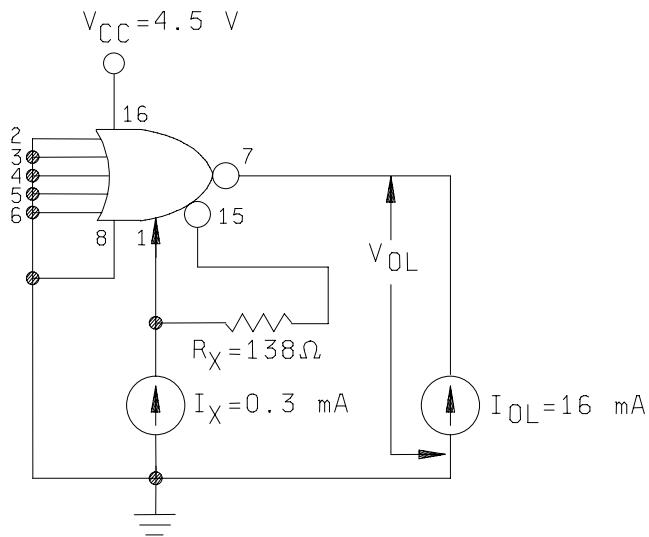
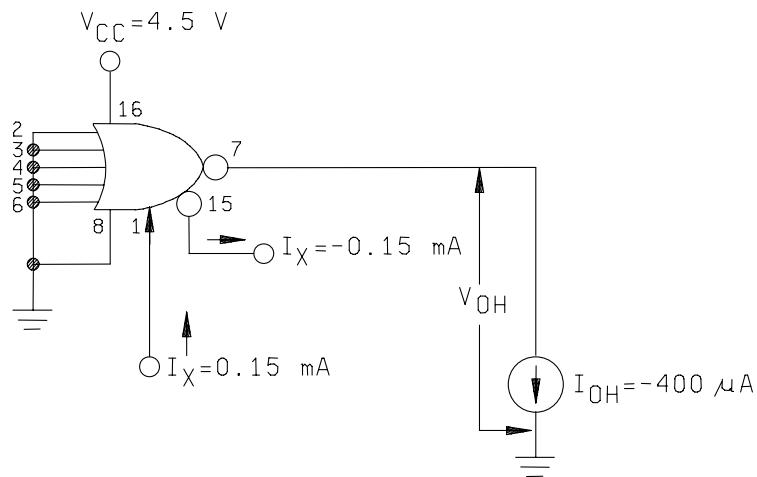
FIGURE 4. Switching time test circuit for device types 01 and 04.



NOTES:

1. $C_L = 50 \text{ pF}$ minimum including scope probe, wiring, and stray capacitance, without package in test fixture.
2. Voltage measurements are to be made with respect to network ground terminal.
3. All diodes are 1N3064 or equivalent.
4. $R_L = 390 \Omega \pm 5\%$.

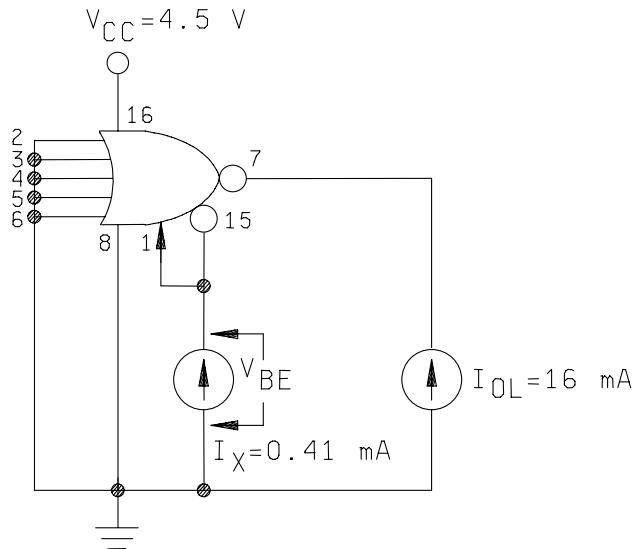
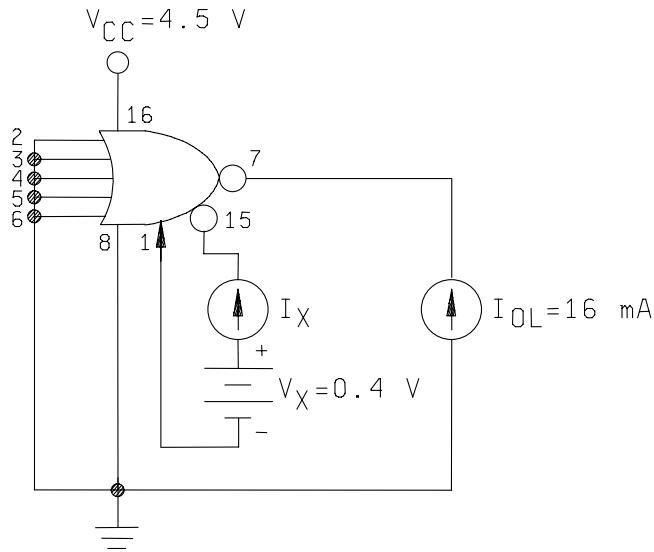
FIGURE 5. Switching time test circuit for device types 02 and 03.

FIGURE 6. Low level output voltage test circuit for device type 02.

NOTE:

At the manufacturer's option, the high level output voltage for the expanded inputs, may be verified by an alternate equivalent procedure. The procedure is to omit the $-400 \mu\text{A}$ current source on pin 7 (Y) and to connect a $6 \text{ k}\Omega \pm 1\%$ resistor in parallel with a voltmeter between the output pin and ground. The V_{OH} minimum limit is met if the resultant voltage drop across the resistor is greater than 2.4 V.

FIGURE 7. High level output voltage test circuit for device type 02.

FIGURE 8. Base emitter voltage test circuit for device type 02.

NOTE:

At the manufacturer's option, the expander test current limit may be verified by the use of an alternate equivalent procedure. The V_X voltage source and the I_X meter may be replaced with a $110\Omega \pm 1\%$ resistor in parallel with a voltmeter between pins 1 and 15 (X to X). When the applicable conditions are applied, the resultant voltage drop across the resistor is measured. The I_X limit of 3.5 mA is met if the resultant voltage does not exceed 0.4 V.

FIGURE 9. Expander current test circuit for device type 02.

TABLE III. Group A inspection for device type 01.
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-863 method	Test No.	Cases A,B,D												Test limits			
				Case C		1	2	3	4	5	6	7	8	9	10	11	12	13	14
				1A	1B	1Y	V _{CC}	2Y	2A	2B	3Y	3A	3B	GND	GND	GND	4A	4B	4Y
1 $T_A = 25^\circ\text{C}$	V_{OL}	3007	1	2.0 V	GND	16 mA	4.5 V		GND	GND				"	"		1Y	1Y	0.4 V
			2	2.0 V	GND	2.0 V	"	GND	GND				"	"		"	"	"	
			3	"	GND	"	"	"	16 mA	2.0 V				"	"		2Y	2Y	"
			4	"	"	"	"	GND	2.0 V	"			"	"		"	2Y	2Y	"
			5	"	"	"	"	"	16 mA	GND	16 mA			"	"		3Y	3Y	"
			6	"	"	"	"	"	"	"	16 mA	GND	2.0 V	"	"		3Y	3Y	"
			7	"	"	"	"	"	"	"	"	GND	2.0 V	"		16 mA	16 mA	"	
			8	"	"	"	"	"	"	"	GND	"	GND	"	2.0 V	16 mA	4Y	4Y	"
			9	0.8 V	0.8 V	-400 μA	"	"	5.5 V	5.5 V				"	5.5 V		1Y	2.4 Y	"
			10	5.5 V	5.5 V	"	"	"	-400 μA	0.8 V	5.5 V			"	5.5 V		2Y	2Y	"
2 I_{OH}		3006	11	"	"	"	"	"	"	0.8 V	0.8 V			"	0.8 V		3Y	3Y	"
			12	"	"	"	"	"	"	5.5 V	5.5 V			"	0.8 V		4Y	4Y	"
			13	GND	GND	GND	5.5 V		GND	GND	GND	GND	GND	GND	GND	GND	1Y	-20	-55 mA
			14	"	"	"	"	"	"	"	"	"	"	"	"		2Y	2Y	"
			15	"	"	"	"	"	"	"	"	"	"	"	"		3Y	3Y	"
			16	"	"	"	"	"	"	"	"	"	"	"	"		4Y	4Y	"
			17	2.4 V	GND	2.4 V		GND	GND	GND	GND	GND	GND	GND	GND	GND	1A	40 μA	"
			18	"	GND	2.4 V		GND	2.4 V	"	"	"	"	"	"		1B	44	"
3 I_{IH1}		3010	19	"	"	"	"	GND	2.4 V	"	"	"	"	"	"	"	2A	44	"
			20	"	"	"	"	GND	GND	"	"	"	"	"	"		2B	44	"
			21	"	"	"	"	"	"	2.4 V	"	"	"	"	"		3A	44	"
			22	"	"	"	"	"	"	GND	2.4 V	"	"	"	"		3B	44	"
			23	"	"	"	"	"	"	"	GND	2.4 V	"	"	"		4A	44	"
			24	"	"	"	"	"	"	"	"	GND	2.4 V	"	"		4B	44	"
			25	5.5 V	"	"	"	GND	5.5 V	"	"	"	"	"	"		1A	100	"
			26	"	"	"	"	"	"	"	"	"	"	"	"		1B	100	"

TABLE III. Group A inspection for device type 01. - Continued
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D												Test limits			
			Case C		1	2	3	4	5	6	7	8	9	10	11	12	13	14
			Test No.	1A	1B	1Y	V _{CC}	2Y	2A	2B	3Y	3A	3B	GND	4A	4B	4Y	Meas. terminal
1 $T_A = 25^\circ C$	I _{H2}	3010	27	GND	GND	5.5V	GND	5.5V	GND	GND	GND	GND	GND	GND	2A	2B	100 μA	
			28	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			29	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			30	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			31	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			32	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
	I _L	3009	33 CKT A	0.4V	5.5V	"	"	5.5V	5.5V	5.5V	5.5V	5.5V	5.5V	5.5V	5.5V	5.5V	5.5V	
			33 CKT B	0.4V	5.5V	"	"	"	"	"	"	"	"	"	"	"	"	"
			34 CKT A	5.5V	0.4V	"	"	"	"	"	"	"	"	"	"	"	"	"
			34 CKT B	"	0.4V	"	"	"	"	"	"	"	"	"	"	"	"	"
2 $T_A = T_C = 125^\circ C$	I _{CCH}	3005	41	GND	GND	"	"	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	
			42	5.0V	5.0V	"	"	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	
	V _{IC}	43	44	-12 mA	4.5V	"	"	-12 mA	"	"	"	"	"	"	"	"	"	"
			45	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			46	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			47	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			49	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
			50	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
3 $T_A = T_C = -55^\circ C$																		

2 Same tests, terminal conditions and limits as for subgroup 1, except $T_A = T_C = 125^\circ C$ and V_{IC} tests are omitted.

3 Same tests, terminal conditions and limits as for subgroup 1, except $T_A = T_C = -55^\circ C$ and V_{IC} tests are omitted.

TABLE III. Group A inspection for device type 01.
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D												Test limits					
			Cases C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Min	Max
9 $T_A = T_C = 25^\circ\text{C}$	t_{PHL}	3003	51	IN	GND	OUT	5.0 V	2Y	2A	2B	3Y	3A	3B	GND	4A	4B	4Y	1A to 1Y	3	20 ns
		(Fig. 4)	52	1B	1Y	V _{CC}	"	OUT	IN	GND	"	"	"	GND	"	"	"	2A to 2Y	"	"
		"	53	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	3A to 3Y	"	"
		"	54	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	4A to 4Y	"	"
		"	55	IN	GND	OUT	"	OUT	IN	GND	OUT	"	"	IN	GND	"	"	1A to 1Y	3	25 u
	t_{PLH}	"	56	"	"	"	"	OUT	IN	GND	OUT	"	"	IN	GND	"	"	2A to 2Y	"	"
		"	57	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	3A to 3Y	"	"
		"	58	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	4A to 4Y	"	"
		"	59	IN	GND	OUT	"	OUT	IN	GND	OUT	"	"	IN	GND	"	"	1A to 1Y	3	24 u
		"	60	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	2A to 2Y	"	"
10 $T_A = T_C = 125^\circ\text{C}$	t_{PHL}	"	61	"	"	"	"	OUT	IN	GND	OUT	"	"	IN	GND	"	"	3A to 3Y	"	"
		"	62	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	4A to 4Y	"	"
		"	63	IN	GND	OUT	"	OUT	IN	GND	OUT	"	"	IN	GND	"	"	1A to 1Y	3	27 u
	t_{PLH}	"	64	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	2A to 2Y	"	"
		"	65	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	3A to 3Y	"	"
		"	66	"	"	"	"	"	"	"	"	"	"	IN	GND	"	"	4A to 4Y	"	"
11	Same tests, terminal conditions and limits as for subgroup 10, except $T_A = T_C = -55^\circ\text{C}$.																			

TABLE III. Group A inspection for device type 02. - Continued
Terminal conditions (pins not designated may be $H \geq 2.0\text{ V}$ or $L \leq 0.8\text{ V}$ or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Test limits		
			Test No.	1X	1A	1B	1G	1C	1D	1Y	GND	2Y	2A	2B	2G	2C	2D	\bar{I}_X	V_{CC}	Meas. terminal	Mn	Max
10 $T_A = 125^\circ\text{C}$	t_{PLH}	3003 Fig 5	67 68			IN	GND	2.4 V	GND	OUT	GND	OUT	IN	GND	2.4 V	GND	GND	5.0 V	1A to 1Y	3	30	ns
11																		5.0 V	2A to 2Y	3	30	ns

11 Same tests, terminal conditions and limits as for subgroup 10, except $T_A = -55^\circ\text{C}$.

1/ See test figure 6.

2/ See test figure 7.

3/ See test figure 8.

4/ See test figure 9.

TABLE III. Group A inspection for device type 03. - Continued
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits
			Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
$T_A = T_C = 25^\circ\text{C}$	I _{H2}	3010	27	GND	GND	5.5V	GND	GND	GND	2Y	2A	2G	2C	2D	V _{CC}	5.5V	1G	400 μA	
		"	28	"	GND	5.5V	GND	GND	"				"				1C	100 "	"
		"	29	"	GND	GND	5.5V	"					"				1D	"	"
		"	30	"													2A	"	"
		"	31														2B	"	"
		"	32														2G	400 "	"
		"	33														2C	100 "	"
		"	34														2D	100 "	"
	I _{L1}	3009	35	0.4V	5.5V	5.5V	5.5V	5.5V	5.5V	"	"					"	1A	-1.6 mA	-1.6 "
		"	36	5.5V	0.4V	"	5.5V	"	5.5V	"	"					"	1B	-1.6 "	-1.6 "
$T_A = T_C = 100^\circ\text{C}$	I _{L2}	3009	43	5.5V	0.4V	"	5.5V	"	0.4V	"	"						1C	-1.6 "	-1.6 "
		"	44	"	5.5V	"	0.4V	"	5.5V	0.4V	"						1D	-1.6 "	-1.6 "
		"	45	"	5.5V	"	0.4V	"	5.5V	"	0.4V	"					2A	-1.6 "	-1.6 "
		"	46	"													2B	-1.6 "	-1.6 "
		"	47	"													2C	-1.6 "	-1.6 "
		"	48	-12 mA	-12 mA												2D	-1.6 "	-1.6 "
		"	49		-12 mA														
		"	50		-12 mA														
		"	51		-12 mA														
		"	52																

TABLE III. Group A inspection for device type 03. - Continued
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD 883 method	Cases A,B,D												Test limits								
			Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Min	Max	Unit		
1 $T_A = 25^\circ C$	V _{IC}	Test No.	1A	1B	1G	1C	1D	1Y	GND	2Y	2A	2B	2G	2C	2D	V _{CC}	4.5 V	2B	-1.5	V			
	"		53						GND								"	2G	"	"	"		
	"		54						"								"	2C	"	"	"		
	"		55						"								"	2D	"	"	"		
2																	-12 mA						
3																	-12 mA						
9 $T_A = 25^\circ C$	t _{PHL}		3003	57	IN	GND	2.4 V	GND	GND	OUT	GND							5.0 V	1A to 1Y	3	20	ns	
	t _{PHL}	(Fig. 5)	58									"	OUT	IN	GND	2.4 V	GND	GND	"	2A to 2Y	3	20	"
	t _{PLH}	"	59	IN	GND	2.4 V	GND	GND	OUT	"								"	1A to 1Y	3	25	"	
	t _{PLH}	"	60							"	OUT	IN	GND	2.4 V	GND	GND	"	2A to 2Y	3	25	"		
10 $T_A = 125^\circ C$	t _{PHL}	"	61	IN	GND	2.4 V	GND	GND	OUT	"								"	1A to 1Y	3	24	"	
	t _{PHL}	"	62							"	OUT	IN	GND	2.4 V	GND	GND	"	2A to 2Y	3	24	"		
	t _{PLH}	"	63	IN	GND	2.4 V	GND	GND	OUT	"							"	1A to 1Y	3	27	"		
	t _{PLH}	"	64							"	OUT	IN	GND	2.4 V	GND	GND	"	2A to 2Y	3	27	"		
11																							

Same tests, terminal conditions and limits as for subgroup 1, except $T_A = 125^\circ C$ and V_{IC} tests are omitted.

Same tests, terminal conditions and limits as for subgroup 1, except $T_A = -55^\circ C$ and V_{IC} tests are omitted.

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits	
			Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
			Test No.	1A	1B	2A	2B	2C	2Y	GND	3Y	3A	3B	3C	1Y	1C	V _{CC}	.4	v	
1	V _{OL} $T_A = T_C = 25^\circ C$	3007	1	2.0 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	
			"	2	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	"	
			4	3	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	1Y	1Y	
			4	4	"	2.0 V	"	"	"	"	"	"	"	"	"	"	"	2.0 V	1Y	
			4	5	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	GND	2Y	
			5	6	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	2Y	
			6	7	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	2Y	
			7	8	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	3Y	
			8	9	GND	2.0 V	"	"	"	"	"	"	"	"	"	"	"	"	3Y	
			9	10	GND	0.8 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V					
			11	12	GND	5.5 V	0.8 V	0.8 V	0.8 V	0.8 V	-800 μ A	-800 μ A	-800 μ A	-800 μ A						
			12	13	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	
4	I _{OH}	3006	I _{OH1}	14	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	I _{OH2}	
			15	16	GND	2.4 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	40 μ A	
			17	18	GND	2.4 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	1A	
			19	20	GND	2.4 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	1B	
			21	22	GND	2.4 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	2A	
4	I _{HL}	3010	23	24	GND	5.5 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	
			25	26	GND	5.5 V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	

TABLE III. Group A inspection for device type 04. - Continued
 Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D								Cases C								Test limits			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Min	Max	Unit		
1	I _{H2}	3010	27	GND	GND	5.5V	GND	GND	GND	GND	GND	GND	GND	GND	GND	5.5V	2A	100	μA			
	T _A = T _C = 25°C	"	28	"	GND	5.5V	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	2B	"	"	"		
	"	"	29	"	"	GND	5.5V	GND	"	"	"	"	"	"	"	"	2C	"	"	"		
	"	"	30	"	"	GND	5.5V	GND	"	"	"	"	"	"	"	"	3A	"	"	"		
	"	"	31	"	"	GND	5.5V	GND	"	"	"	"	"	"	"	"	3B	"	"	"		
	"	"	32	"	"	GND	5.5V	GND	"	"	"	"	"	"	"	"	3C	"	"	"		
	"	"	33	"	"	GND	5.5V	GND	"	"	"	"	"	"	"	"	1C	"	"	"		
"	I _L	3009	34	0.4V	5.5V	5.5V	5.5V	"	"	"	"	"	"	"	"	"	1A	-7	-1.6	mA		
"	"	"	35	5.5V	0.4V	"	"	"	"	"	"	"	"	"	"	"	1B	"	"	"		
"	"	"	36	"	5.5V	0.4V	"	"	"	"	"	"	"	"	"	"	2A	"	"	"		
"	"	"	37	"	"	5.5V	0.4V	"	"	"	"	"	"	"	"	"	2B	"	"	"		
"	"	"	38	"	"	"	5.5V	0.4V	"	"	"	"	"	"	"	"	2C	"	"	"		
"	"	"	39	"	"	"	"	5.5V	0.4V	"	"	"	"	"	"	"	3A	"	"	"		
"	"	"	40	"	"	"	"	"	0.4V	"	"	"	"	"	"	"	3B	"	"	"		
"	"	"	41	"	"	"	"	"	"	0.4V	"	"	"	"	"	"	3C	"	"	"		
"	"	"	42	"	"	"	"	"	"	"	0.4V	"	"	"	"	"	1C	"	"	"		
"	I _{CCH}	3005	43	GND	GND	GND	GND	GND	GND	V _{CC}	15.6											
"	I _{CCL}	3005	44	5.0V	5.0V	5.0V	5.0V	"	"	"	"	"	"	"	"	"	V _{CC}	25.5				
"	V _{IC}	45	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	-12 mA	4.5V	1A	-1.5	V		
"	"	46	"	"	"	"	"	"	"	"	"	"	"	"	"	"	1B	"	"	"		
"	"	47	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2A	"	"	"		
"	"	48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2B	"	"	"		
"	"	49	"	"	"	"	"	"	"	"	"	"	"	"	"	"	2C	"	"	"		
"	"	50	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3A	"	"	"		
"	"	51	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3B	"	"	"		
"	"	52	"	"	"	"	"	"	"	"	"	"	"	"	"	"	3C	"	"	"		

TABLE III. Group A inspection for device type 04. - Continued
Terminal conditions (pins not designated may be H \geq 2.0 V or L \leq 0.8 V or open).

Subgroup	Symbol	MIL-STD-883	Cases A,B,D Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Test limits
		Test No.	1A	1B	2A	2B	2C	2Y	GND	3Y	3A	3B	3C	1Y	1C	VCC	Meas. terminal	Min Max Unit
1	$T_A = T_C = 25^\circ\text{C}$	V _{IC}		53											-12 mA	4.5 V	1C	-1.5 V
2			Same tests, terminal conditions and limits as for subgroup 1, except $T_A = T_C = 125^\circ\text{C}$ and V _{IC} tests are omitted.															
3			Same tests, terminal conditions and limits as for subgroup 1, except $T_A = T_C = -55^\circ\text{C}$ and V _{IC} tests are omitted.															
9	t_{PHL}	3003 (Fig. 4)	54	IN	GND	IN	GND	GND	GND	OUT	"	OUT	IN	GND	GND	OUT	GND	5.0 V
	"	"	55														"	2A to 2Y
	"	"	56														"	3A to 3Y
	t_{PLH}	"	57	IN	GND	IN	GND	GND	GND	OUT	"	OUT	IN	GND	GND	OUT	GND	"
	"	"	58														"	1A to 1Y
	"	"	59														"	2A to 2Y
	t_{PHL}	"	60	IN	GND	IN	GND	GND	GND	OUT	"	OUT	IN	GND	GND	OUT	GND	"
	"	"	61														"	3A to 3Y
	t_{PLH}	"	62														"	1A to 1Y
	"	"	63	IN	GND	IN	GND	GND	GND	OUT	"	OUT	IN	GND	GND	OUT	GND	"
	"	"	64														"	2A to 2Y
	"	"	65														"	3A to 3Y
11			Same tests, terminal conditions and limits as for subgroup 10, except $T_A = T_C = -55^\circ\text{C}$.															

5. PACKAGING

5.1 Packaging requirements. Microcircuits shall be prepared for delivery in accordance with MIL-M-38510.

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

6.1 Notes. The notes specified in MIL-M-38510 are applicable to this specification.

6.2 Intended use. Microcircuits conforming to this specification are intended for use for Government microcircuit applications (original equipment) and logistic purposes.

6.1 Intended use. Microcircuits conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

6.3 Ordering data. The contract should specify the following:

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Complete part number PIN and compliance identifier, if applicable (see 1.2).
- c. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
- d. Requirement for certificate of compliance, if applicable.
- e. Requirements for notification of change of product or process to procuring acquiring activity in addition to notification to the qualifying activity, if applicable.
- f. Requirements for failure analysis (including required test condition of method 5003), corrective action and reporting of results, if applicable.
- g. Requirements for product assurance options.
- h. Requirements for carriers, special lead lengths or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.
- i. Requirements for "JAN" marking.
- j. Packaging requirements (see 5.1).

6.3 Superseding information. The requirements of MIL-M-38510 have been superseded to take advantage of the available Qualified Manufacturer Listing (QML) system provided by MIL-PRF-38535. Previous references to MIL-M-38510 in this document have been replaced by appropriate references to MIL-PRF-38535. All technical requirements now consist of this specification and MIL-PRF-38535. The MIL-M-38510 specification sheet number and PIN have been retained to avoid adversely impacting existing government logistics systems and contractor's parts lists.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

6.5 Abbreviations, symbols and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-STD-1313 MIL-PRF-38535 and MIL-STD-1331, and as follows:

GND	Electrical ground (common terminal)
V _{IN}	Voltage level at an input terminal
V _{IC}	Input clamp voltage
I _{IN}	Current-flowing into an input terminal

6.6 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits procured acquired for Government logistic support will be procured acquired to device class B (see 1.2.2), lead material and finish A (see 3.4). Longer lead lengths and lead forming shall not affect the part number.

6.6 Substitutability. Microcircuits covered by this specification will replace the following commercial device types:

6.7 Substitutability. The cross-reference information below is presented for the convenience of users.

Microcircuits covered by this specification will functionally replace the listed generic-industry type. Generic-industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-35810 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

<u>Device type</u>	<u>Commercial type</u>
01	5402
02	5423
03	5425
04	5427

6.8 Supersession information. MIL-M-0038510/4B was issued as an "in lieu of" document for MIL-M-38510/4A. This revision, MIL-M-38510/4D, supersedes MIL-M-0038510/4B(USAF) and MIL-M-38510/C.

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians: Army - EL
Navy - EG
Air Force - 17

Preparing activity: Air Force - 17

Review activities: Army - MI, MU
Air Force - 11, 19, 85, 99
DLA - ES

(Project 5962-0164)

User activities: Army - EL, SM
Navy - CG, MC, AS, OS

Custodians: Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity: DLA - CC

(Project 5962-2075)

Review activities: Army - MI, SM
Navy - AS, CG, MC, SH, TD
Air Force - 03, 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at www.dodssp.daps.mil.